

What is claimed is:

- 1 1. A particulate-matter-delivery system comprising:
2 (I) a cylindrical storage hopper having:
3 (IA) a substantially-circular profile along the cylindrical axis; and
4 (IB) a substantially-circular hopper opening adapted to expel particulate matter
5 from the cylindrical storage hopper;
6 (II) a bin having:
7 (IIA) a bin outlet;
8 (IIB) a trough-shaped feeder having a substantially-rectangular top opening; and
9 (IIC) a transitional section having:
10 (IIC1) a substantially-circular opening coupled to the substantially-circular
11 hopper opening;
12 (IIC2) a circular-to-rectangular conduit interposed between the substantially-
13 circular bin opening and the substantially-rectangular top opening of
14 the trough-shaped feeder;
15 (III) an auger having an auger rotational axis, the auger being located within the bin, the
16 auger being operatively coupled to the bin outlet, the auger being configured to rotate
17 about the auger rotational axis; and
18 (IV) an auger motor coupled to the auger, the auger motor being configured to rotate the
19 auger about the auger rotational axis when the motor is activated, the rotating of the
20 auger resulting in expulsion of the particulate matter through the bin outlet.

1 2. The system of claim 1, further comprising
2 (V) an agitator having an agitator rotational axis, the agitator being located within the bin;
3 and
4 (VI) an agitator motor coupled to the agitator, the agitator motor being configured to rotate
5 the agitator about the agitator rotational axis, the rotating of the agitator resulting in
6 agitation of the particulate matter in the bin.

1 3. A particulate-matter-delivery system comprising: 
2 a trough-shaped feeder with a rectangular feeder opening; and
3 a rectangular-to-circular conduit having a circular end and a rectangular end, the
4 rectangular-to-circular conduit extending from the rectangular opening of the trough-shaped
5 feeder, the circular end having a circular conduit opening, the rectangular end having a
6 rectangular opening mated to the rectangular feeder opening.

1 4. The system of claim 3, wherein the area of the rectangular feeder opening is
2 greater than the area of the circular conduit opening.

1 5. The system of claim 3, further comprising a storage hopper having a circular
2 hopper opening, the circular hopper opening being coupled to the circular conduit opening.

1 6. The system of claim 3, further comprising:
2 an auger located within the trough-shaped feeder, the auger having an auger rotational
3 axis; and
4 an auger motor coupled to the auger, the auger motor being configured to rotate the
5 auger about the auger rotational axis when the motor is activated, the rotating of the auger
6 resulting in expulsion of the particulate matter from the trough-shaped feeder.

1 7. A particulate-matter-delivery system comprising:
2 a trough-shaped feeder with a substantially-rectangular feeder opening; and
3 a rectangular-to-elliptical conduit having an elliptical end and a rectangular end, the
4 rectangular-to-elliptical conduit extending from the substantially-rectangular opening of the
5 trough-shaped feeder, the elliptical end having a substantially-elliptical conduit opening, the
6 rectangular end having a substantially-rectangular conduit opening, the substantially-
7 rectangular conduit opening being mated to the substantially-rectangular feeder opening.

1 8. The system of claim 7, wherein the rectangular-to-elliptical conduit is a
2 rectangular-to-circular conduit, the rectangular-to-circular conduit having a circular end and
3 a rectangular end, the rectangular-to-circular conduit extending from the substantially-
4 rectangular opening of the trough-shaped feeder, the circular end having a substantially-
5 circular conduit opening, the rectangular end having a substantially-rectangular conduit
6 opening, the substantially-rectangular conduit opening being mated to the substantially-
7 rectangular feeder opening.

1 9. The system of claim 7, wherein the area of the substantially-rectangular feeder
2 opening is greater than the area of the substantially-elliptical conduit opening.

1 10. The system of claim 9, wherein the cross-sectional area of the rectangular-to-
2 elliptical conduit progressively decreases from the rectangular conduit end to the elliptical
3 conduit end.

1 11. The system of claim 7, further comprising a storage hopper having a
2 substantially-elliptical hopper opening, the substantially-elliptical hopper opening being
3 coupled to the substantially-elliptical conduit opening.

1 12. The system of claim 7, wherein the trough-shaped feeder comprises means for
2 expelling particulate matter.

1 13. The system of claim 7, wherein the trough-shaped feeder comprises an outlet
2 adapted to expel particulate matter.

1 14. The system of claim 13, further comprising:
2 an auger located within the trough-shaped feeder, the auger being operatively coupled
3 to the outlet, the auger having an auger rotational axis; and
4 an auger motor coupled to the auger, the auger motor being configured to rotate the
5 auger about the auger rotational axis when the motor is activated, the rotating of the auger
6 resulting in expulsion of the particulate matter through the outlet.

1 15. The system of claim 13, wherein the combination of the trough-shaped feeder
2 and the rectangular-to-elliptical conduit defines a bin.

1 16. The system of claim 15, further comprising:
2 an agitator located within the bin, the agitator having an agitator rotational axis; and
3 an agitator motor coupled to the agitator, the agitator motor being configured to rotate
4 the agitator about the agitator rotational axis, the rotating of the agitator resulting in agitation
5 of particulate matter in the bin.

1 17. A method for reducing bridging in particulate-matter-delivery systems, the
2 method comprising the steps of: ✓
3 interfacing a storage hopper with a trough-shaped feeder using a circular-to-
4 rectangular conduit; and
5 directing particulate matter from the storage hopper to the trough-shaped feeder
6 through the circular-to-rectangular conduit.

1 18. A method for reducing bridging in particulate-matter-delivery systems, the
2 method comprising the steps of: ✓
3 interfacing a storage hopper with a trough-shaped feeder using an elliptical-to-
4 rectangular conduit; and
5 directing particulate matter from the storage hopper to the trough-shaped feeder
6 through the elliptical-to-rectangular conduit.

1 19. The method of claim 18, wherein the interfacing step comprises the step of:
2 providing an elliptical-to-rectangular conduit having a substantially-elliptical opening
3 at the elliptical end of the conduit and a substantially-rectangular opening at the rectangular
4 end of the conduit, the area of the substantially-rectangular opening being greater than the
5 area of the substantially-elliptical opening.

1 20. The method of claim 18, wherein the interfacing step comprises the steps of:
2 coupling the storage hopper to the elliptical end of the elliptical-to-rectangular
3 conduit; and
4 coupling the trough-shaped feeder to the rectangular end of the elliptical-to-
5 rectangular conduit.

1 21. A method for reducing bridging in particulate-matter-delivery systems, the
2 method comprising the steps of:

3 coupling a cylindrical storage hopper to a elliptical end of the elliptical-to-rectangular
4 conduit, the cylindrical storage hopper having a substantially-elliptical axial profile, the
5 cylindrical storage hopper further having a substantially-elliptical hopper opening, the
6 elliptical end of the elliptical-to-rectangular conduit having a substantially-elliptical conduit
7 opening, the substantially-elliptical conduit opening being substantially similar in shape to
8 the substantially-elliptical hopper opening, the substantially-elliptical conduit opening being
9 substantially similar in size to the substantially-elliptical hopper opening; and

10 coupling a trough-shaped feeder to a rectangular end of the elliptical-to-rectangular
11 conduit, the trough-shaped feeder having a substantially-rectangular feeder opening, the
12 rectangular end of the elliptical-to-rectangular conduit having a substantially-rectangular
13 conduit opening, the substantially-rectangular conduit opening being substantially similar in
14 shape to the substantially-rectangular feeder opening, the substantially-rectangular conduit
15 opening being substantially similar in size to the substantially-rectangular feeder opening.

1 22. The method of claim 21, further comprising the step of:
2 directing particulate matter from the storage hopper to the trough-shaped feeder
3 through the elliptical-to-rectangular conduit.